MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2321
Gaithersburg, Maryland 20899

SRM Number: 1935
MSDS Number: 1935
SRM Name: Potassium Dichromate Solution
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Potassium Dichromate Solution

Description: SRM 1935 consists of solutions 60.06 mg/L potassium dichromate in a 0.01 N sulfuric acid solution and a set of 0.01 N sulfuric acid "blank" solutions.

Other Designations: **Potassium Dichromate** (dichromic acid; dipotassium salt; potassium bichromate; dipotassium dichromate; bichromate of potash; iopezite; chromic acid; dipotassium salt)/ **Sulfuric Acid** (hydrogen sulfate; dihydrogen sulfate; sulfuric acid; dithionic acid)

Name	Chemical Formula	CAS Registry Number
Potassium Dichromate	$K_2Cr_2O_7$	7778-50-9
Sulfuric Acid	H_2SO_4	7664-93-9

DOT Classification: Not hazardous by DOT regulations (based on low concentrations of potassium dichromate and sulfuric acid).

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Limits and Toxicity Data
Potassium Dichromate	~ 6	OSHA Ceiling Limit: 0.1 mg $(CrO_3)/m^3$
		OSHA TLV-TWA: 0.05 $(Cr)/m^3$
		NIOSH TLV-TWA: 0.001 $(Cr(VI))/m^3$
		Child, Oral: LD_{LO}: 26 mg/kg
		Rat, Oral: LD_{50}: 25 mg/kg
		Mouse, Oral: LD_{50}: 190 mg/kg
		Mouse, Subcutaneous: LD_{LO}: 100 mg/kg
Sulfuric Acid	~ 0.05	ACGIH TLV-TWA: 2 mg/kg or 5 mg/m^3
		OSHA TLV-TWA: 1 mg/m^3
		Human, Oral: LD_{LO}: 135 mg/kg

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Potassium Dichromate (solid)	Sulfuric Acid (0.01 N)
Appearance and Odor: odorless, bright orange-red crystal with a bitter metallic taste	**Appearance and Odor:** odorless, colorless to brown dense hygroscopic oily liquid
Relative Molecular Mass: 294.20	**Relative Molecular Mass:** 98.07
Density: 2.676	**Density:** 1.84
Boiling Point: 500 °C (decomposes)	**Boiling Point:** ~ 100 °C
Melting Point: 398 °C	**Melting Point:** not applicable
Heat of Solution: -62.5 cal/g	**Heat of Solution:** not available
Water Solubility: soluble	**Water Solubility:** soluble
Solvent Solubility: soluble in inorganic acids	**Solvent Solubility:** not available

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this potassium dichromate/sulfuric acid solution do not exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not applicable **Method Used:** Not applicable **Autoignition Temperature:** Not applicable

Flammability Limits in Air (Volume %): **UPPER:** Not applicable
LOWER: Not applicable

Extinguishing Media: Use water only. **DO NOT** use dry chemicals, carbon dioxide, or halogenated extinguishing agents.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full facepiece in the pressure-demand or positive-mode and other protective clothing.

Unusual Fire and Explosion Hazards: Potassium dichromate is a negligible fire hazard. This material is an oxidizer and may ignite or explode on contact with combustible materials.

SECTION V. REACTIVITY DATA

Stability: __X__ **Stable** _____ **Unstable**

Conditions to Avoid: Keep this material from excessive heat and incompatible materials.

Incompatibility (Materials to Avoid): This material is incompatible with metals, combustible materials, reducing agents, amines, cyanides, and bases.

See Section IV: *Unusual Fire and Explosion Hazards*

Hazardous Decomposition or Byproducts: Thermal decomposition of potassium dichromate may release toxic and/or hazardous gases. Sulfuric acid attacks some coatings, plastics, and rubber; it is incompatible with combustible materials, halo carbons, oxidizing materials, amines, bases, halogens, metal carbides, acids, metals, metal salts, peroxides, and reducing agents.

Hazardous Polymerization: _____ **Will Occur** __X__ **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: __X__ **Inhalation** __X__ **Skin** __X__ **Ingestion**

Health Hazards (Acute and Chronic): Potassium Dichromate: Concentrations of potassium dichromate above the regulated levels are immediately dangerous to life and health. Exposure to chromium dust and/or vapors may cause nasal irritation, lung irritation, coughing, labored breathing, wheezing, chest pain, ulceration and perforation of the nasal septum, pulmonary edema, jaundice, and liver and kidney damage. Continued exposure by this method can cause erosion and discoloration of the teeth, painless ulceration of the nasal septum, nose bleeds, and foul nasal discharge. An excess risk for lung and sinonasal cancer has been reported in workers in chromate production, chromate pigment production, and chromium industries.

Skin contact with potassium dichromate can cause painless, penetrating, slow healing lesions. Prolonged or repeated exposure may cause dermatitis. Direct contact with the eye may cause irritation, redness, pain, tearing, conjunctivitis, and blurred vision. Ingestion of soluble dichromate salts may cause violent gastroenteritis, diarrhea, peripheral vascular collapse, dizziness, muscle cramps, coma, fever, and acute renal failure. Prolonged or repeated ingestion is not likely to occur but may cause liver and kidney damage.

Potassium dichromate is recognized as a carcinogen. An evaluation on chromium (VI) compounds based on the combined results of epidemiological studies, carcinogenicity studies in experimental animals, and several types of other relevant data that support the underlying concept that chromium (VI) ions generated at critical sites in the target cells are responsible for the carcinogenic action observed.

Sulfuric Acid: Concentrated sulfuric acid may be fatal if inhaled, swallowed, or absorbed through skin. This material causes burns and is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may be fatal as a result of spasm, inflammation, and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

NOTE: This material has a very low concentration of sulfuric acid.

Medical Conditions Generally Aggravated by Exposure: Not Applicable

Listed as a Carcinogen/Potential Carcinogen (Potassium Dichromate):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	X	
In the International Agency for Research on Cancer (IARC) Monographs	X	
By the Occupational Safety and Health Administration (OSHA)		X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Obtain medical assistance immediately.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance.

Ingestion: If ingestion occurs, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Potassium Dichromate: skin, liver, kidneys, respiratory system, and pulmonary system

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: Notify safety personnel of large leaks or spills. Remove sources of ignition. Do not touch spilled material. Small spills can be taken up with sand or other absorbent material and placed in a container for later disposal. Do not flush directly to sewer or surface waters.

Waste Disposal: Dispose of the material via internal safety office or licensed contractor. Follow all federal, state, and local regulations.

Handling and Storage: Those handling potassium dichromate should use full protective clothing and equipment to prevent body contact with the liquid. Use rubber gloves or gauntlets, apron, long-sleeved shirts, etc. An eyewash station, washing facilities, and safety shower must be readily available to areas of use and handling. Provide adequate exhaust ventilation to meet TLV requirements.

> **NOTE:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Store containers in a clean, cool, well-ventilated area out of direct sunlight and away from oxidizing agents and sources of heat. Provide emergency neutralization materials and equipment near areas of storage and use.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources:

MDL Information Systems, Inc., MSDS *Potassium Dichromate,* 21 March 1984.
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The Merck Index, 11th Ed., 1989.
Webster's Ninth New Collegiate Dictionary, 1990.
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